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# SOIL MOISTURE DEFICITS AND SPRING CULTIVATIONS

by R A Blackmore

## 1. Introduction

This note reports on relationship between soil moisture deficit and field work days for Spring cultivation on various soil types.

During 1966 some 35 farmers, on varying soil types in East Midlands Region NAAS., kept work records. These showed the dates on which they were able to get onto the land and prepare seedbeds etc.

In addition daily rainfall amounts from the nearest Met. station to each farm were made available. This rainfall and work day data were reported in Ag. Memo. 168.

The farms were categorised into four groups by soil type: Heavy, Medium, Light and Mixed by soil scientists (who based these divisions mainly on soil texture and drainage characteristics).

## II Method

The soil moisture deficit was calculated at each site for each day, on and after March 1st, under the following assumptions:

a) The soil was at field capacity at the end of February.
b) That the actual evaporation from the soil was at the average potential rate and given by: $\frac{\text{Evaporation for the month*}}{\text{No. of days in month}}$ inches per day.
c) That the rate of evaporation from the soil was not affected by the work the farmer did to it.

## III Results

| | Heavy | Medium | Light |
|---|---|---|---|
| Soil moisture deficit at first day of field work in the spring (inches) | .36<br>.25<br>.46<br>.34<br>.12<br>.20<br>.17<br>.36<br>.21<br>.37<br>.36<br>.41<br>.52<br>.27<br>.26<br>.56 | .23<br>.02<br>.20<br>.23<br>.24<br>.16<br>.08 | .06<br>.04<br>F.C. |
| Mean | 0.326 | 0.166 | 0.033 |
| Standard Deviation ($\sigma$) | 0.121 | 0.079 | |

| | Heavy | Medium |
|---|---|---|
| Soil moisture deficit at first return to work after first break due to rain (inches) | .37<br>.36<br>.55<br>.11<br>.38<br>.59<br>.66<br>.57<br>.65<br>.43<br>.39<br>.66<br>.40<br>.67 | .52<br>.34<br>.04<br>.18<br>.35<br>.61 |
| Mean | 0.485 | 0.340 |
| Standard Deviation ($\sigma$) | 0.157 | 0.192 |

* Average figure from MAFF Tech. Bulletin No. 16.

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'Students' t test was used to see if the differences between the two means, for Heavy and Medium soil, were significant.

For the soil moisture deficit before work started t= 3.20 and for the return to work after the first break t = 3.63.

This gives a difference which is significant at the 0.005 level.

Another interesting comparison can be made between the means of the light, medium and heavy soil. The means are 0.03, 0.17 and 0.33 inches respectively and therefore are in the approximate ratio 0:1:2.

No sensible comparisons could be drawn from subsequent breaks because the soil moisture deficits, at return to work, were too widely distributed. These often ranged from field capacity to 0.6 inches for all soil types.

IV Conclusion

From this it would seem that the soil moisture deficit before work initially commences is fairly critical, but once work has started there are factors other than weather which influence the farmer's decision on work or no work.

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